RAMTEQ®
QUALITY PRESSURE WASHERS

# OPERATOR'S MANUAL

## CH SERIES
## Gas Engine / Diesel Fired

### READ THIS MANUAL

This manual contains important information for the use and safe operation of your RAMTEQ® machine. **FAILURE TO READ THIS MANUAL AND FOLLOW ITS INSTRUCTIONS PRIOR TO OPERATING OR ATTEMPTING ANY SERVICE OR MAINTENANCE PROCEDURE COULD RESULT IN SERIOUS INJURY OR DEATH TO YOU OR OTHER PERSONS; ALSO DAMAGE TO THE MACHINE OR TO OTHER PROPERTY.**

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## Unpacking Instructions

### INSPECTION

Carefully unpack your new RAMTEQ equipment by removing the shrink wrap & banding from pallet. Remove the pressure washer from the pallet and check for any physical damages that may have occurred during shipment. Check for all parts specified and shown in figure 1.

**INCLUDED PARTS**

- Pallet
- Packing Material Outer Box
- CH Series Machine
- Operator's Manual
- Wand / Trigger Gun
- Nozzles 0° 15° 25° 40°
- Hose 3/8" X 50'
- QC Hose Fittings

### NOTICE

Information in this operator's manual is subject to change without notice.

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## Safety Guidelines

***READ THIS FIRST!*** **FAILURE TO READ AND OBSERVE ALL WARNING STATEMENTS COULD RESULT IN SEVERE BODILY INJURY OR DEATH, POSSIBLE INJURY TO OTHER PERSONS, DAMAGE TO MACHINE OR OTHER PROPERTY.**

- DO NOT operate this machine in areas where open flames are not permitted. DO NOT store or use combustible materials on or near this machine. Use this equipment only in well ventilated areas. Failure to follow this warning may cause carbon monoxide build up, fire or explosion, and possible injury or death.
- DO NOT fill gasoline tank while engine is running. Allow engine to cool before refueling. Should gasoline be spilled, move the machine away from the area of the spill. Do not attempt to restart the machine until the gasoline has fully evaporated.
- DO NOT operate engine if air cleaner or cover directly over the carburetor air intake is removed.
- DO NOT touch hot mufflers, cylinders or fins, as contact may cause burns
- DO NOT operate this machine while under the influence of alcohol, drugs or while fatigued.
- DO NOT direct discharge stream at yourself or others. Risk of injection or injury may occur. Never put your hand or fingers over the spray tip. Do not try to stop or deflect leaks with your hand or body. Always face nozzle and wand to the ground when testing.
- DO NOT operate this machine WITHOUT wearing protective Eye Wear. Gloves, Hard Hat, Mask, Ear Plugs & Steel Toe Work Boots are also recommended, DO NOT wear loose clothing. Keep your body and clothing clear of the engine and discharge stream when the machine is running.
- DO NOT tie back or block trigger gun in OPEN position. Never leave the pressure washer unattended once you have started it. If you leave, shut down machine completely.
- DO NOT overreach or stand on an unstable support while operating this machine. Maintain good footing and balance.
- DO NOT permit this machine to run while unattended or for extended periods of time with trigger gun closed. Damage to pump may occur.
- DO NOT operate this machine in an unsafe manner or around unsupervised children. Keep all other personnel clear while operating this machine. This product should only be operated by trained personnel.
- DO NOT alter original factory settings prior to operating this machine. Risk of injury to yourself or other persons may occur.
- DO NOT remove hoses, guns, nozzles or any components while this machine is still hot or while it is running.
- DO NOT attempt to service this machine before reading the service manual.
- DO NOT use water with a temperature over 140 degrees FareCHeit
- DO NOT put diesel fuel in to a gasoline tank or gasoline into a diesel tank. Observe correct markings on fuel tanks before filling.
- DO NOT operate this machine without knowing how to stop and bleed water pressures. Know all controls before using this machine.
- DO NOT spray caustic, acids or abrasive fluids through this machine.
- DO NOT permit water to freeze inside this machine. Pump and plumbing damage may occur.
- Use only recommended RAMTEQ™ parts when servicing this machine.
- RAMTEQ™ will not be held liable for any unauthorized modifications made to this machine. Any such action will void the warranty.
- When connecting battery, ensure that the RED battery cable is connected to the POSITIVE pole on the battery and the BLACK is connected to the NEGATIVE pole on the battery

## Maintenance Instructions

### MAINTENANCE PRECAUTIONS

- Do not permit acidic, caustic or abrasive fluids to be pumped through system.
- Periodically clean detergent inlet screen. This will ensure proper flow of water to the pump.
- High mineral content in water may adversely affect your machine and may require the use of a water softener to ensure proper operation.
- NEVER run the pump dry under any circumtances. Doing so will cause exteme damage to the pump.

**FAILURE TO MAINTAIN HEAT EXCHANGER COIL MAY RESULT IN A STEAM EXPLOSION WHICH MAY CAUSE SERIOUS INJURY OR DEATH.**

### HEAT EXCHANGER COIL MAINTENANCE

- Hard water conditions may eventually cause clogging in the heat exchanger coil if left unattended. Scale deposits will compromise the heating efficiency and produce an unsafe condition over time. It may be necessary to descale coil.
- Scale buildup from certain detergents may eventually clog up the heat exchanger coil causing an unsafe condition. Use only recommended detergents for better cleaning efficiency.
- Black carbon deposits that collect on the outside wall of the heat exchanger coil may be a result of using a poor grade of fuel or improper burner operation. Heating fuel should be void of water and sediments to eliminate the possibility of sooting and compromising the efficiency of the coil.

#### MOVING, STORAGE

- Place machine in covered area when not in use to protect from elements.Protect machine from freezing in cold temperatures by storing in a heated location.

#### ENGINE MAINTENANCE

| | |
|---|---|
| ■ Every time (before start): | Check oil level. |
| ■ First 8 hours: | Change oil with **SAE 30W High-Detergent Oil.** |
| ■ Every 25 hours: | Change oil if operating under heavy load or high ambient temperature. Service air cleaner pre-cleaner. |
| ■ Every 50 hours: | Change oil. Clean and inspect spark arrester if equipped. |
| ■ Every 100 hours: | Service air cleaner cartridge, replace oil filter (if equipped), Clean oil cooler (if equipped), Clean cooling system. |

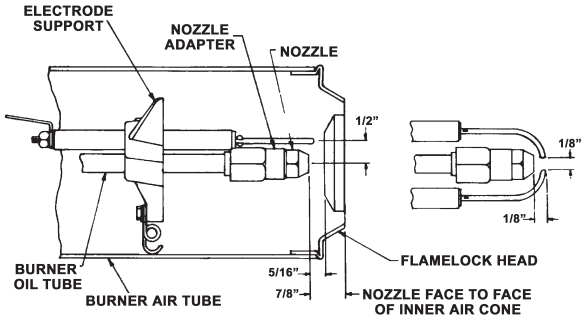
#### WINTERIZING

- Non-float Tank Machines: To protect the machine from freezing temperatures while storing or transporting, connect short length of garden hose (approximately 3 ft.) to water inlet connection on machine. Remove the pressure nozzle from the wand and insert the short garden hose end into a container of antifreeze. Place the wand into the antifreeze container and start engine running machine until antifreeze appears from the end of the wand. Turn engine "OFF" and replace pressure nozzle. Coil up hose and move machine to storage area.

## Maintenance Instructions

## ELECTRODE SETTINGS

■ Inspection of all wires, spring contacts and electrodes should be done periodically.



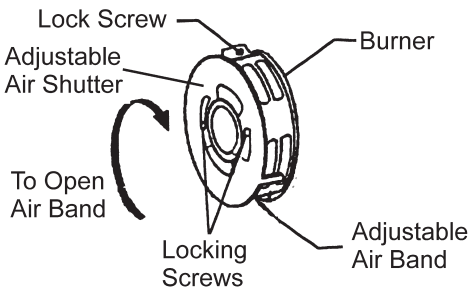

**WARNING**

**IF BLACK OR WHITE SMOKE VENTS FROM EXHAUST PORT UPON STARTING EQUIPMENT, DISCONTINUE USE AND ADJUST AIR BANDS BEFORE RESTARTING.**

## OIL BURNER AIR BAND ADJUSTMENT

RAMTEQ® sets oil burners at sea level. Air bands may need adjustment at higher elevations to offer eCHanced performance of the burner and extended life of the machine.

■ Adjustment of burner is done with pump motor and thermostat set to maximum. Loosen locking screw on air band, then close band until black smoke vents up exhaust vent. Take careful note of air band position when black smoke is first noticed. Slowly open air band until white smoke vents, then turn air band halfway back to where black smoke was first noted. Tighten air band locking screw. When properly set, the unit should NOT have either "black" smoke or "white" smoke during operation.




### PUMP MAINTENANCE

- Fill crankcase to dot on oil gauge window per specifications with the specific oil created by the pump manufacturer (i.e. **General Pump Oil**). Ensure the right oil for specific pump as it may vary.
- Change oil after **25 Hour Break-in Period.**
- Change oil every **Three Months or at 100 Hour Intervals** thereafter.

### UNLOADER ADJUSTMENT

- All RAMTEQ machines have the unloader correctly set at the the factory. Setting an unloader is a difficult job without the proper equipment and training. Should the need arise to change the unloader settings, please contact your local distributor.

## Operating Instructions

### LOCATION GUIDELINES

- Locate the machine on a solid and level surface so that engine and pump crankcase oil lubricate components properly. Avoid areas where water can build up in the working area. Possible injury can occur caused by the surface becoming slippery from water build up.
- Locate the machine in a well-ventilated area and away from flammable materials or fumes. Be sure ventilation warnings are observed. Keep pressure washer at least 18" away from flamable materials.
- Locate the machine so the operator has easy access to the jetter/pressure washer and its controls. Locate the machine so that it is protected from external damage.
- To prevent damage and excessive hose wear, locate the unit so that the hose does not cross traffic areas.

### STARTING THE MACHINE

**Following the steps below will insure successful operation:**

- Read this manual completely before attempting to start the machine.
- Check the fuel tank and fill with a good grade of gasoline (87 octane minimum) for gas engines and a high quality diesel fuel for diesel engines.
- Check the engine oil level and fill with SAE 30 weight *high-detergent* oil.
- Check the pump oil level and fill with SAE 30w *non-detergent* oil if needed.
- Check water tank to ensure adequate level of water required for the job.
- Pull trigger on gun until a steady stream of water comes out the nozzle. This purges any air in the system.
- Slide fuel switch to the RIGHT and slide choke switch to the LEFT (closed position).
- Turn ON/OFF switch (on engine) to "ON".
- Open water flow to reduce back pressure in pump. Back pressure can overpower electric starter, preventing ignition.
- Turn key to start gas engine and allow RPM to develop.
- Let engine warm up for approximately 30 seconds and slide choke to "OPEN" position.
- Check for leaks in the system and cycle trigger gun to insure bypass is adjusted correctly. Repair any leaks and correct unloader adjustment if needed. Turn off machine before attempting any repairs.
- WARNING - Do not operate machine with less than 6" of water in the tank. Doing so may cause pump damage!

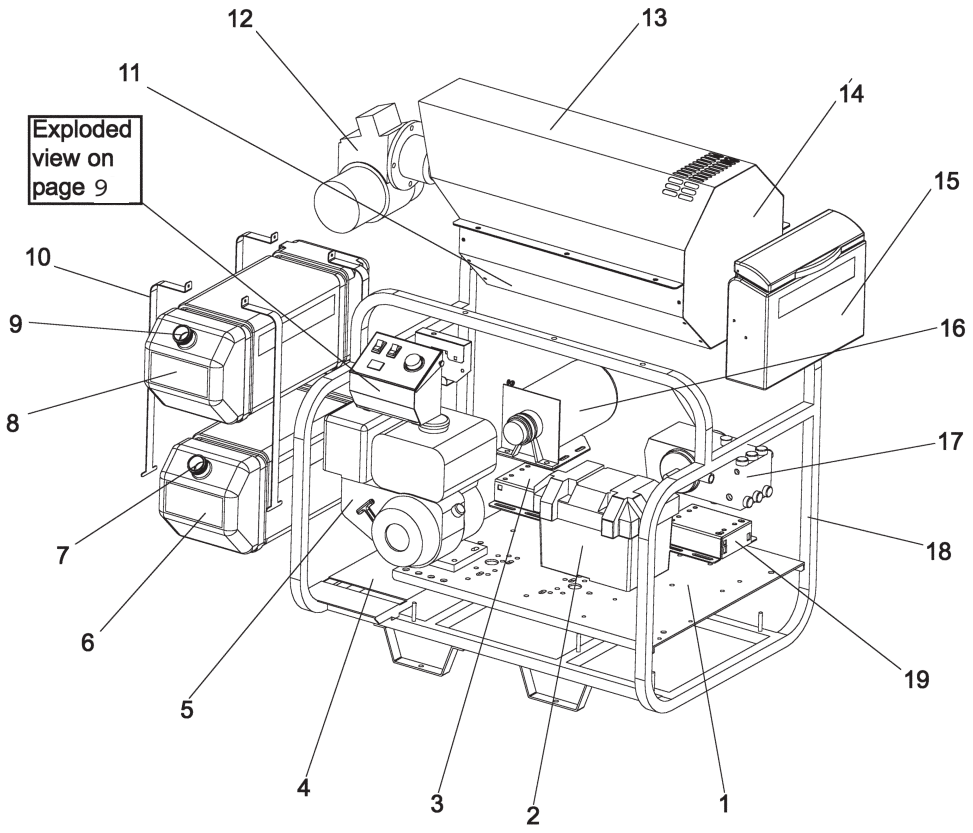
### STOPPING THE MACHINE

- Turn engine to "OFF".
- Pull gun trigger to release water pressure from system.
- Disconnect wand & gun assembly.
- Wind up pressure hose on hose reel.

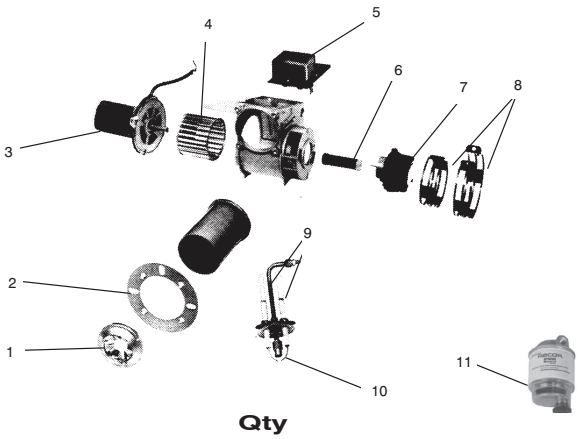
### CAUTION

- Always wear protective safety gear, auch as, but not limited to, rain coat or coveralls, rubber boots, face shield or goggles, gloves and hearing protection.
- Do not run the machine for more than two minutes with the jetter water flow shut off (by-pass mode). This will over heat the jetter pump and could cause injury to you.
- Do not run hot water thru this pump. Hot water will damage the pump, and will void the warranty.

# CH Parts List




| Ref.# | Part # | Description | Qty. |
|---|---|---|---|
| 1 | 180-00011-01 | Plate, Power | 1 |
| 2 | 590-00001-01 | Box, Battery | 1 |
| | 439-00003-01 | Cable, Battery Black (not shown) | 1 |
| | 439-00003-02 | Cablle, Battery Red (not shown) | 1 |
| 3 | 180-00055-01 | Plate, Generator | 1 |
| 4 | 180-00010-01 | Plate, Fuel | 1 |
| 5 | 206-00002-01 | Engine, Gas 11hp Honda GX340K1QNR2 | 1 |
| 5a | 206-00003-01 | Engine, Gas 11hp B&S 235437-0084-01 | 1 |
| 5b | 206-00004-01 | Engine, Gas 13hp Honda GX390K1QNR2 | 1 |
| 5c | 206-00005-01 | Engine, Gas 13hp B&S 245437-0084-01 | 1 |
| 5d | 206-00006-01 | Engine, Gas 16hp B&S 303447-1075-A1 | 1 |
| 5e | 206-00007-01 | Engine, Gas 20hp B&S 351447-1046-A1 | 1 |
| 6 | 190-00001-02 | Tank, Fuel 10gal Red | 1 |
| 7 | 140-00002-01 | Cap, Fuel Guage Gas Red | 1 |
| 8 | 190-00001-01 | Tank, Fuel 10gal Green | 1 |
| 9 | 140-00001-01 | Cap, Fuel Guage Diesel Black | 1 |
| 10 | 180-00013-01 | Bracket, SS, Fuel Tanks | 4 |
| 11 | 180-00017-01 | Shell, SS, Outer Bottom | 1 |
| 12 | 250-00003-01 | Burner Assembly Wayne EH-H-115 (w/generator) | 1 |
| | 250-00006-01 | Burner Assembly Wayne MSR-H-12 (12 volt, not shown) | 1 |
| 13 | 180-00018-01 | Shell, SS Outer Top | 1 |
| 14 | 180-00024-01 | Cap, End SS Closed | 1 |
| 15 | 050-00029-01 | Float Tank Assembly | 1 |
| 16 | 216-00001-01 | Generator, Voltmaster AB-25 | 1 |
| 17 | 220-00003-01 | Pump, General T1011-L (CH1100) | 1 |
| | 220-00006-01 | Pump, General T2011-L (CH1300) | 1 |
| | 220-00010-01 | Pump, General TS2021 (CH1600 4.8@3000/CH2000) | 1 |
| | 220-00008-01 | Pump, General T9281-L (CH1600 4@4000) | 1 |
| 18 | 180-00012-01 | Frame, CH Series | 1 |
| 19 | 180-00048-01 | Bracket, Pump, Belt Tension | 2 |
| | 155-00003-01 | Coil, Large Diesel Fired | 1 |

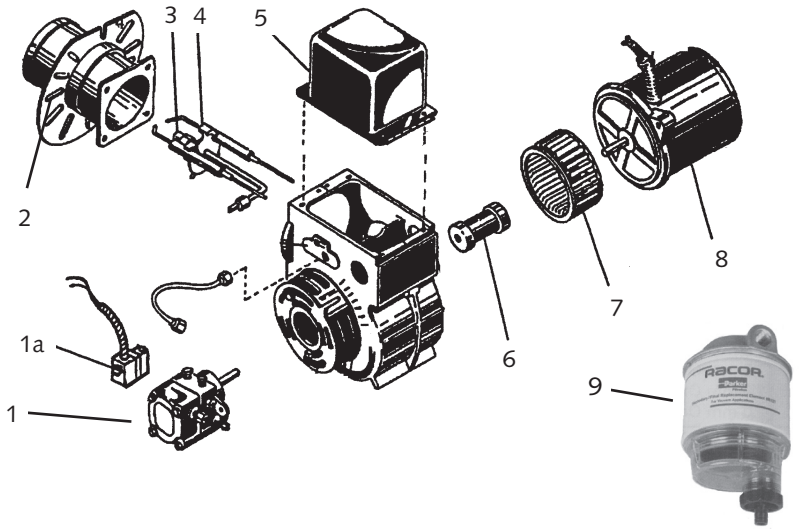



## CH 12V Burner Assembly

| Ref# | Part # | Description | Qty |
|---|---|---|---|
| 1 | 256-00001-02 | Main Burner Gasket | 1 |
| 2 | 253-00002-01 | Fan Wheel 3.44" x 4.25" | 1 |
| 3 | 254-00001-04 | Motor, 12v DC | 1 |
| 3a | | Motor, Flange | 1 |
| 4 | 252-00001-04 | Ignitor | 1 |
| 5 | 253-00001-01 | Coupling | 1 |
| 6 | 251-00001-01 | Fuel Pump Suntec | 1 |
| 7 | 245-00006-16 | Fuel Nozzle 2.25 80° | 1 |
| 8 | 258-00002-03 | Electrodes | 1pr |
| 9 | 577-00003-01 | Filter, Fuel Inline Racor | 1 |
| | 578-00001-01 | Element, Fuel Filter, Racor | 1 |

**Burner Assembly Complete**

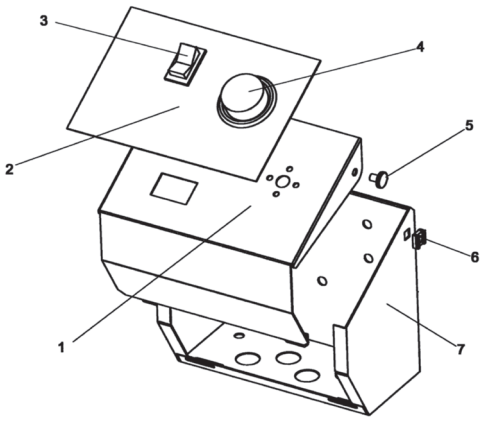
250-00006-01 MSR-H-12 Wayne 12 Volt Burner




## CH 115V Burner Assembly

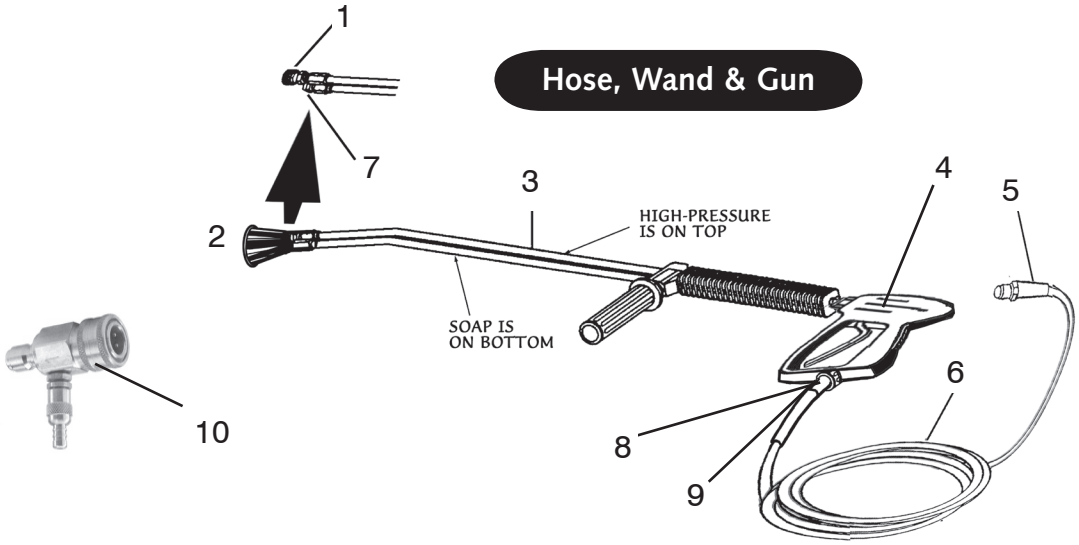
| Ref.# | Part # | Description | Qty |
|---|---|---|---|
| 1a-1 | 252-00002-01 | Fuel Pump Solenoid (NLH150,NLH200, NLH230) | 1 |
| 1a-2 | 252-00002-01 | Fuel Pump Solenoid (NLH300, NLH500) | 1 |
| 2 | 256-00001-01 | Main Burner Gasket | 1 |
| 3 | 245-00006-11 | Nozzle, Fuel 1.35/125psi (NLH150, NLH200, NLH230) | 1 |
| 3b | 245-00006-12 | Nozzle, Fuel 1.65/140psi (NLH300) | 1 |
| 3c | 245-00006-12 | Nozzle, Fuel 1.50/125psi (NLH500) | 1 |
| 4 | 258-00002-01 | Electrode Pair (RH & LH) | 1 |
| 5 | 252-00001-06 | Transformer 115v (NLH150, NLH200, NLH230) | 1 |
| 5a | 252-00001-07 | Transformer 230v (NLH300, NLH500) | 1 |
| 6 | 253-00001-01 | Coupling | 1 |
| 7 | 253-00002-01 | Fan Wheel 3.44" X 4.25" | 1 |
| 8 | 254-00001-01 | Motor 115v/60/1 (NLH150, NLH200, NLH230) | 1 |
| 8a | 254-00001-02 | Motor 208/230v/60/1 (NLH300, NLH500) | 1 |
| 9 | 577-00002-01 | Filter, Fuel Inline | 1 |
| 10 | 557-00001-01 | Clamp, Hose | 2 |
| 11 | 280-00003-01 | Hose, Inlet/Outlet Fuel Line | 1 |
| **Burner Assembly Complete** | | | |
| | 250-00001-01 | Wayne Burner Vertical 115v | 1 |
| | 250-00008-01 | Wayne Burner Vertical 230v | 1 |

## CH Control Box Assembly



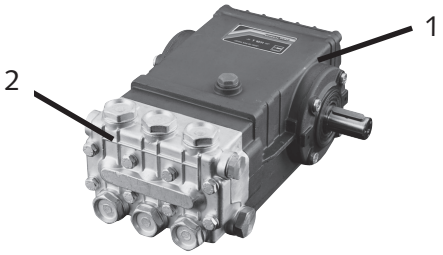

| Ref.# | Part # | Description | Qty |
|---|---|---|---|
| 1 | 180-00027-01 | Control Box Panel | 1 |
| 2 | 305-00006-01 | Label, Control Box Small | 1 |
| 3 | 450-00001-01 | Pump/Burner Switch On/Off | 1 |
| 4 | 573-00001-01 | Thermostat Assembly | 1 |
| 5 | 505-00001-01 | 1/4" X 20 Thumb Screw | 2 |
| 6 | 508-00002-01 | Tinnerman | 2 |
| 7 | 180-00150-01 | Control Box | 1 |

## Hose, Wand & Gun




| Ref# | Part# | Discription | Qty |
|---|---|---|---|
| 1. | 270-00005-01 | Nozzle, Water, #5.5, 0° Quick Connect (16-21 HP) | 1 |
| 1a. | 270-00005-02 | Nozzle, Water, #5.5, 15° Quick Connect (16-21 HP) | 1 |
| 1b. | 270-00005-03 | Nozzle, Water, #5.5, 25° Quick Connect (16-21 HP) | 1 |
| 1c. | 270-00005-04 | Nozzle, Water, #5.5, 40° Quick Connect (16-21 HP) | 1 |
| 1d | 270-00004-01 | Nozzle, Water, #5.0, 0° Quick Connect (20-25 HP) | 1 |
| 1e. | 270-00004-02 | Nozzle, Water, #5.0, 15° Quick Connect (20-25 HP) | 1 |
| 1f. | 270-00004-03 | Nozzle, Water, #5.0, 25° Quick Connect (20-25 HP) | 1 |
| 1g. | 270-00004-04 | Nozzle, Water, #5.0, 40° Quick Connect (20-25 HP) | 1 |
| 1h. | 270-00002-01 | Nozzle, Water, #4.0, 0° Quick Connect (10,13 HP) | 1 |
| 1f. | 270-00002-02 | Nozzle, Water, #4.0, 15° Quick Connect (10,13 HP) | 1 |
| 1g. | 270-00002-03 | Nozzle, Water, #4.0, 25° Quick Connect (10,13 HP) | 1 |
| 1h. | 270-00002-04 | Nozzle, Water, #4.0, 40° Quick Connect (10,13 HP) | 1 |
| 2. | 554-00006-02 | Quick Coupler Socket, 1/4" Male | 1 |
| 3. | 265-00002-01 | Dual Wand, Insulated | 1 |
| 4. | 275-00001-01 | Gun | 1 |
| 5. | 552-00004-03 | Quick Coupler Plug, 3/8" | 1 |
| 6. | 284-00001-01 | Hose Assembly, 50', 3000PSI @ 250°F (10-16 HP) | 1 |
| 6a. | 284-00002-01 | Hose Assembly, 50', 5000PSI @ 250°F (18-25 HP) | 1 |
| 7. | 270-00038-01 | Nozzle, Soap | 1 |
| 8. | 552-00003-03 | Quick Coupler Plug, 3/8 nptm (not shown) | 1 |
| 9. | 554-00007-03 | Quick Coupler Socket, 3/8 nptf (not shown) | 1 |
| 10. | 020-00005-01 | Downstream Injector Kit (hose not shown) | 1 |

## CH Belt Drive Pumps




### General Pump TS2021-R Triplex Plunger Pump

**Pump Repair Parts**

| Ref# | Part# | Description | | Qty |
|---|---|---|---|---|
| 1. | 220-00009-01 | Pump, Complete, General TS2021-R | | 1 |
| 2. | 221-00001-03 | Manifold, Brass Head TS2021 | | 1 |

**Pump Repair Kits (not shown)**

| | | | |
|---|---|---|---|
| 221-00021-01 | Check Valve Assembly Kit #1 | (6 Each) | 1 |
| 221-00020-01 | Oil Seals, Kit #2 | (3 Oil Seals) | 1 |
| 221-00019-01 | Valve Cap and O-Ring, Kit #16 | (6 Each) | 1 |
| 221-00023-01 | V-Packing, Kit #69 | (3 Each) | 1 |
| 221-00031-01 | Piston/Plunger, 20MM | | 3 |

### General Pump TS1511 & T9211Triplex Plunger Pump

**Pump Repair Parts**

| Ref# | Part# | Description | | Qty |
|---|---|---|---|---|
| 1a. | 220-00053-01 | Pump, Complete, General TS1511 | | 1 |
| 1b. | 220-00103-01 | Pump, Complete, General T9211 | | 1 |
| 2a. | contact ramteq | Manifold, Brass Head TS1511 | | 1 |
| 2b. | contact ramteq | Manifold, Brass Head T9211 | | 1 |

**Pump Repair Kits (not shown)**

| | | | |
|---|---|---|---|
| 221-00002-01 | Check Valve Assembly Kit #1 | (6 Each) | 1 |
| 221-00018-01 | Oil Seals, Kit #2 | (3 Oil Seals) | 1 |
| 221-00072-01 | O-Ring for Valve Cap Kit | (6 Each) | 1 |
| 221-00081-01 | Brass Valve Cap Kit | (6 Each) | 1 |
| 221-00029-01 | V-Packing, Kit #69 | (3 Each) | 1 |
| 221-00031-01 | Piston/Plunger, 20MM | | 3 |

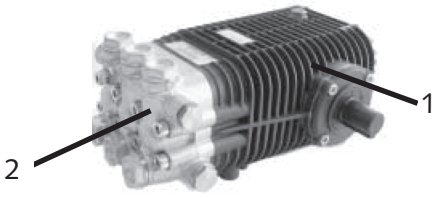
### General Pump T9821 Triplex Plunger Pump

**Pump Repair Parts**

| Ref# | Part# | Description | | Qty |
|---|---|---|---|---|
| 1. | 220-00008-01 | Pump, Complete, General T9821 | | 1 |
| 2. | contact ramteq | Manifold, Brass Head T9821 | | 1 |

**Pump Repair Kits (not shown)**

| | | | |
|---|---|---|---|
| 221-00002-01 | Check Valve Assembly Kit #1 | (6 Each) | 1 |
| 221-00018-01 | Oil Seals, Kit #2 | (3 Oil Seals) | 1 |
| 221-00025-01 | Valve Cap and O-Ring, Kit #6 | (6 Each) | 1 |
| 221-00029-01 | V-Packing, Kit #69 | (3 Each) | 1 |
| 221-00044-01 | Piston/Plunger, 20MM | | 3 |




### Comet SW5540 Triplex Plunger Pump

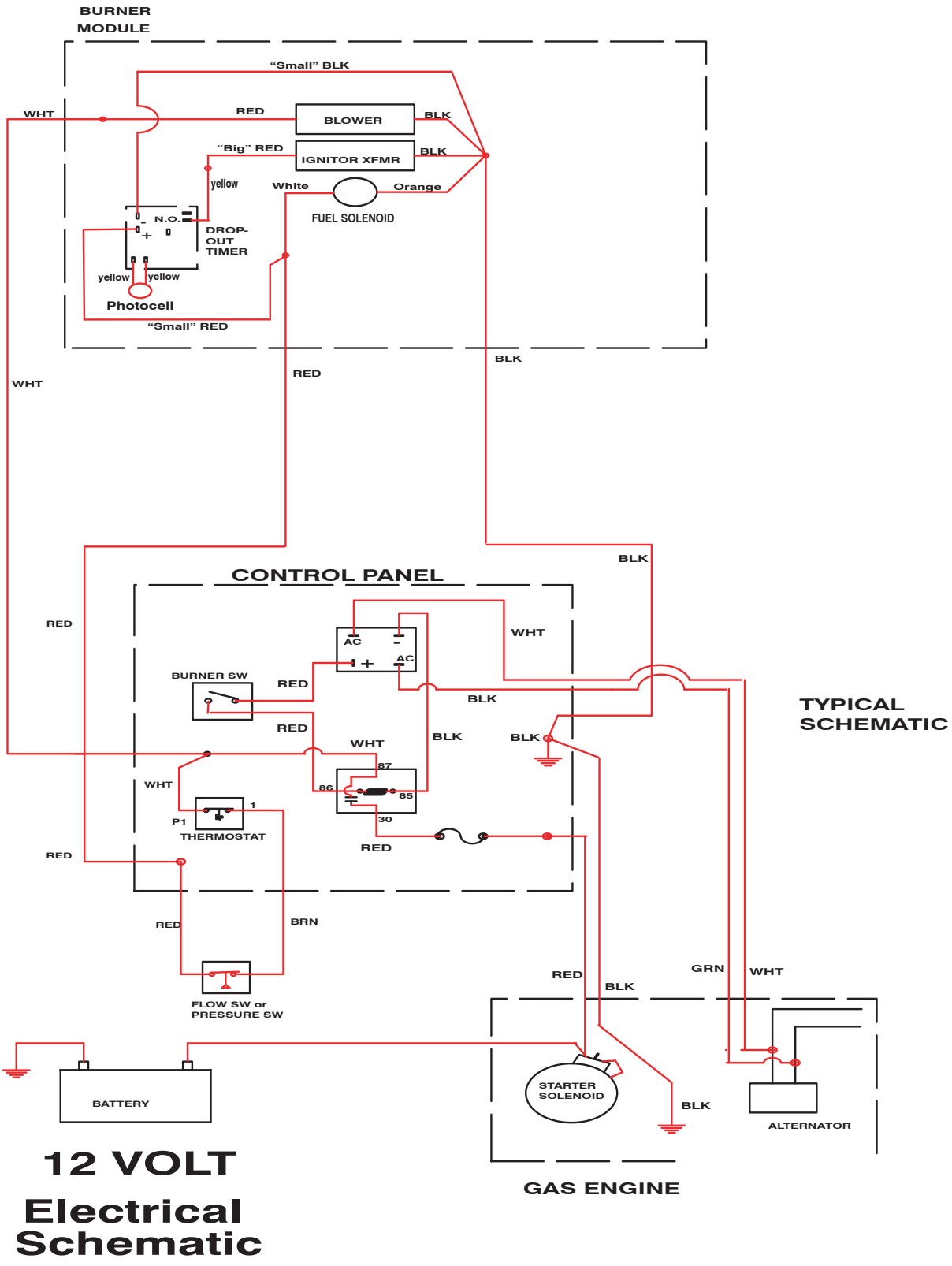
**Pump Repair Parts**

| Ref# | Part# | Description | | Qty |
|---|---|---|---|---|
| 1. | 220-00099-01 | Pump, Complete, Comet SW5540 | | 1 |
| 2. | contact ramteq | Manifold, Brass Head SW5540 | | 1 |

**Pump Repair Kits (not shown)**

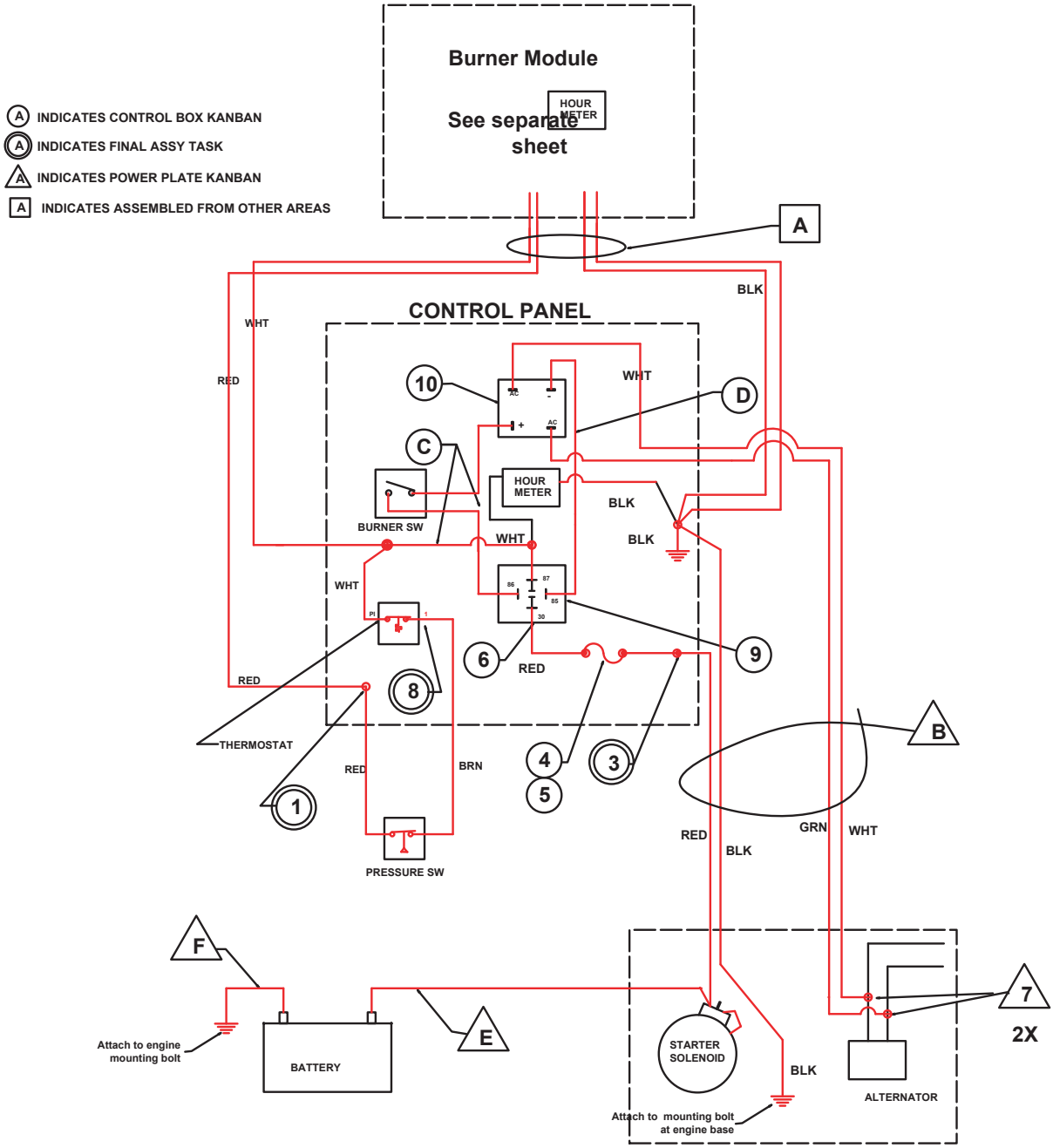
| | | | |
|---|---|---|---|
| 221-00021-01 | Check Valve Kit | (6 Each) | 1 |
| 221-00020-01 | Complete Oil Seals, O-Ring Kit | | 1 |
| 221-00023-01 | Packing Kit | (3 Each) | 1 |

## CH Wiring Diagram



CH Wiring Diagram

# CH - no generator W/ HOUR METER

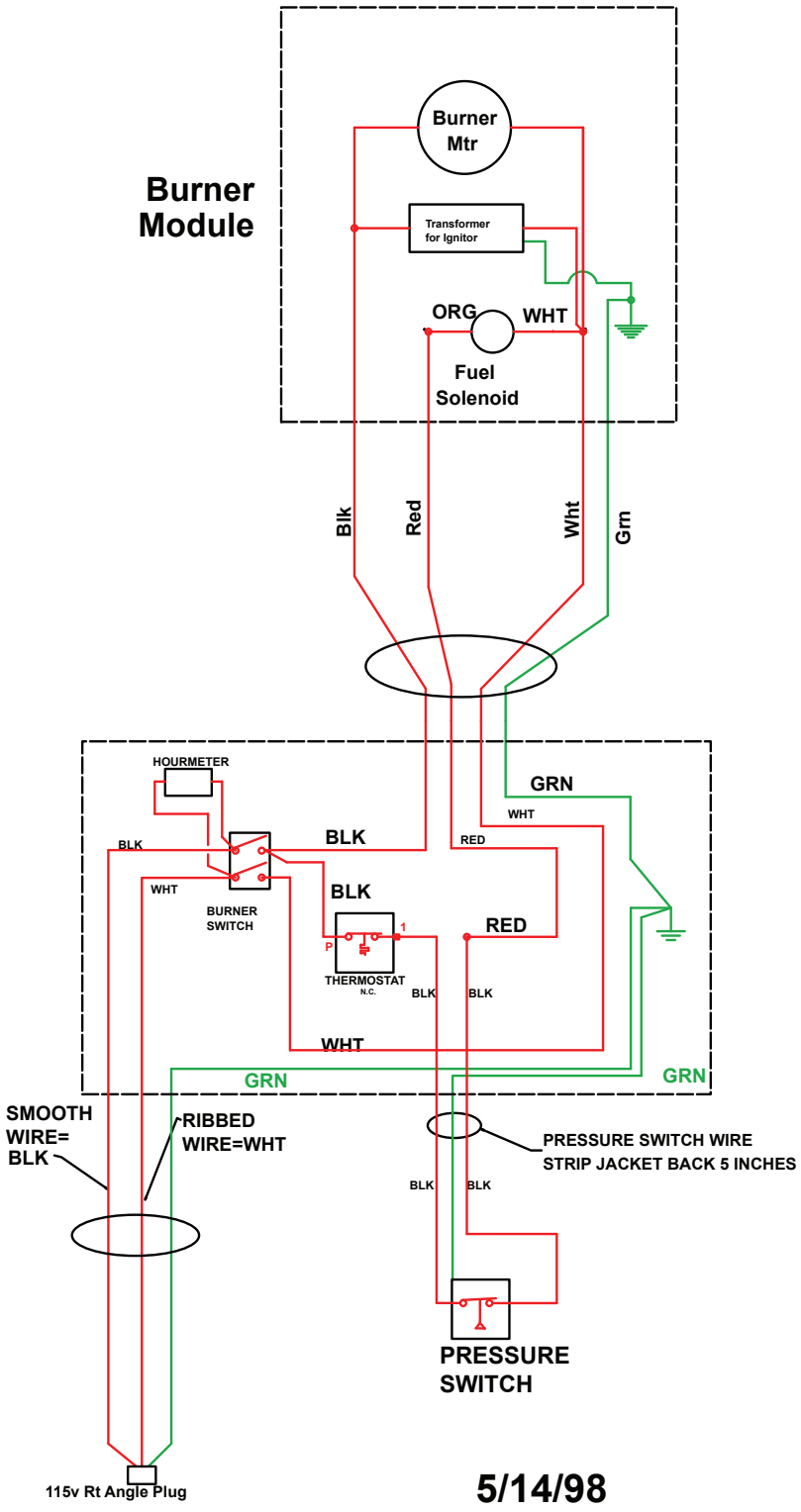



# CH 12 VOLT ELECTRICAL SCHEMATIC

4/29/99

## CH Wiring Diagram

# ELECTRICAL SCHEMATIC
# CH W/ GENERATOR

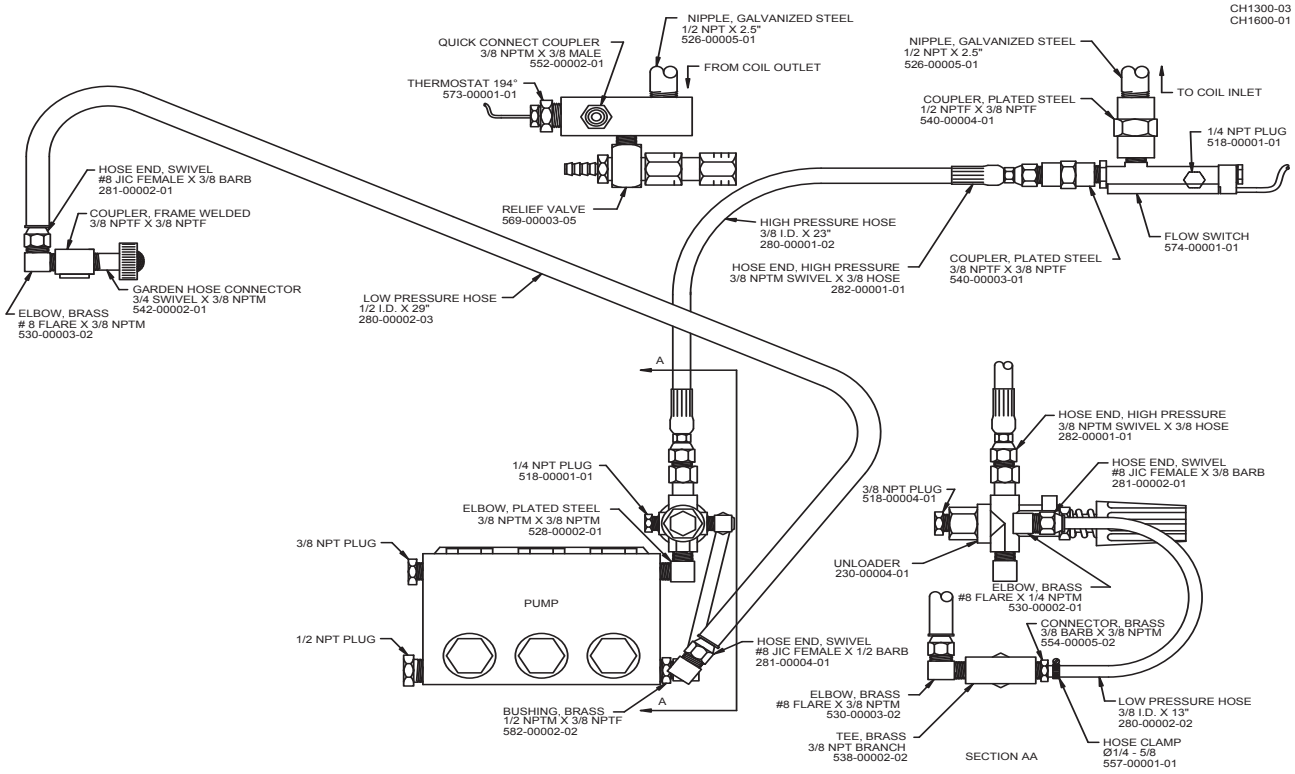



**5/14/98**

# CH Pump Plumbing

## CH BASE

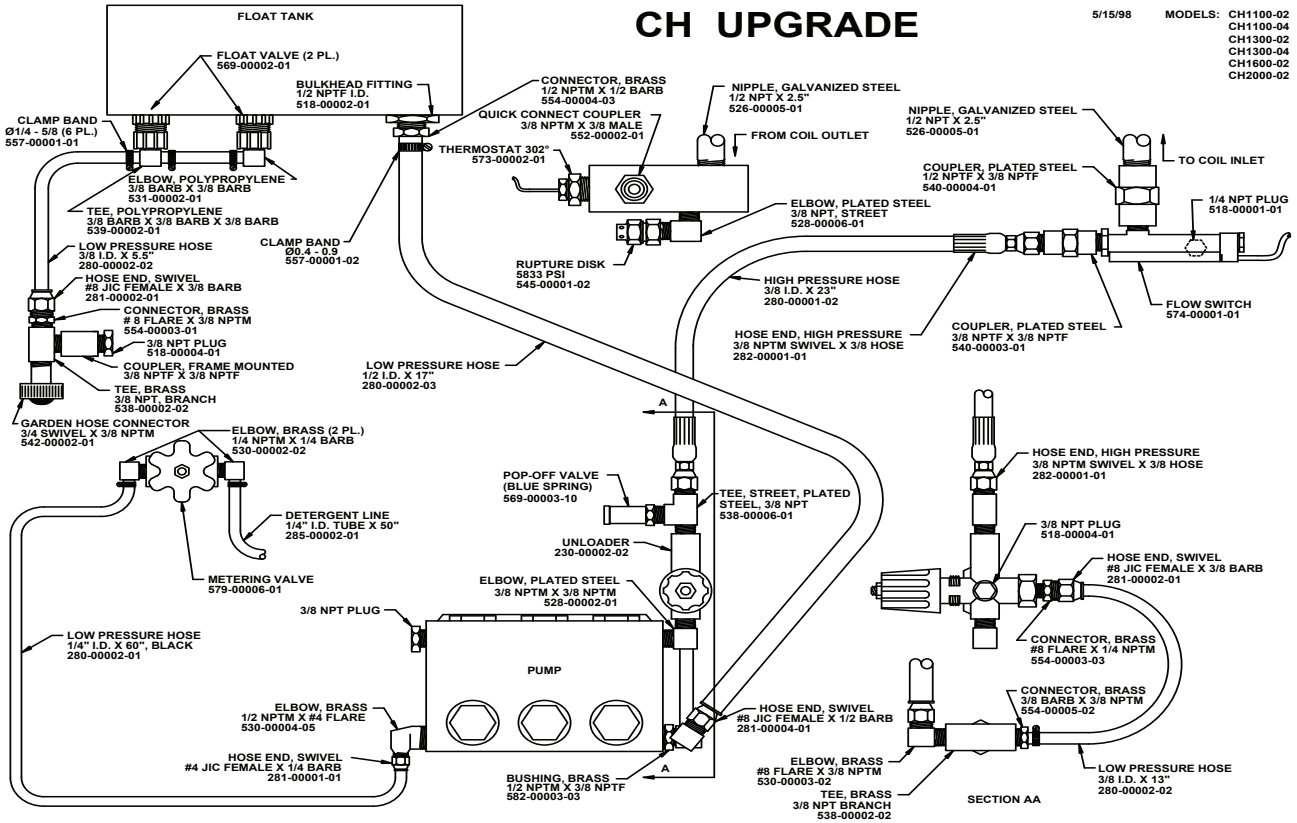
MODELS: CH1100-01
CH1100-03
CH1300-01
CH1300-03
CH1600-01




## CH UPGRADE

5/15/98

MODELS: CH1100-02
CH1100-04
CH1300-02
CH1300-04
CH1600-02
CH2000-02



## Troubleshooting

| problem | cause | action |
|---|---|---|
| Low Water Pressure | Insufficient water source<br>Old or incorrect nozzle<br>Plumbing or hose leak<br>Obstruction in spray nozzle<br>Chemical valve open<br>Unloader valve worn<br>Pump valves dirty or worn | Check hose size/water source<br>Replace nozzle<br>Tighten, repair or replace leak<br>Clean or replace nozzle<br>Close valve or submerge hose<br>Replace unloader<br>Clean or replace packing/valves |
| No Chemical Flow | Detergent valve closed<br>Low detergent level<br>Chemical screen dirty | Open detergent valve<br>Fill detergent container<br>Clean detergent screen |
| Burner Not Igniting | No fuel<br>Burner switch turned off<br>Thermostat set too low<br>Clogged fuel filter<br>Defective pressure switch<br>Clogged burner nozzle<br>Fuel pump malfunction<br>Improper electrode setting | Fill fuel tank with proper fuel<br>Turn burner switch on<br>Reset thermostat<br>Replace fuel filter<br>Replace pressure switch<br>Replace burner nozzle<br>Replace fuel pump<br>Clean/reset to specifications |
| Excessive Burner Smoke | Improper fuel being used<br>Water contamination in fuel<br>Improper air band adjustment<br>Low fuel pressure<br>Air leaks in fuel lines<br>Soot on coils/burner assembly<br>Misaligned electrodes<br>Dirty burner nozzle | Use Diesel #1/#2 or Kerosene<br>Drain fuel and replace with new<br>Readjust air band/altitude<br>Adjust to specifications<br>Check for air leaks or bubbles<br>Clean coils/burner assembly<br>Realign to specifications<br>Clean or replace burner nozzle |
| Pressure Relief Valve Leaks | Nozzle is dirty<br>Defective relief valve<br>Unloader adjusted incorrectly<br>Restriction on discharge hose<br>Scale restricting flow in coil | Clean or replace nozzle<br>Replace relief valve<br>Adjust unloader valve<br>Remove nozzle and flush line<br>Clean coil |
| Engine Will Not Start | Throttle lever off<br>No fuel in engine<br>Bad fuel or wrong fuel in engine<br>Worn, foul, or dirty spark plug(s)<br>Pressure bulid up in pump | Turn throttle lever to "on" position<br>Fill fuel tank if needed<br>Check to ensure correct fuel in tank<br>Check spark plugs<br>Squeeze trigger on gun |
| Engine runs rough/no power | Low oil level<br>Dirty air filter<br>Bad fuel or wrong fuel in engine<br>Worn, foul, or dirty spark plug(s)<br>Overchoking<br>Engine has lost compression<br>Intake valve stuck open or stuck closed<br>Incorrect fuel/air mixture | Check oil level, fill if needed<br>Check and replace air filter if needed<br>Check to ensure correct fuel in tank<br>Check spark plugs<br>Open choke fully and crank engine<br>Service engine at repair center<br>Service engine at repair center<br>Service engine at repair center |
| Pump Noisy | Air in suction line<br>Pump valves dirty<br>Check valve springs worn<br>Low pump oil<br>Pump bearings are worn<br>Incoming water too hot | Check inlet water fittings<br>Clean/replace pump valves<br>Replace check valves<br>Add SEA 30wt. non-detergent<br>Replace/rebuild pump<br>Reduce temperature/ambient |
| Water In Oil | High humidity environment<br>Oil seal worn<br>Plunger packing worn | Change oil frequently<br>Check and replace oil seal<br>Check and replace packing |
| Water Dripping/Pump | Plunger packing is worn<br>Plunger retainer oil ring worn<br>Cracked ceramics | Install new packing kit<br>Replace oil ring<br>Replace ceramics |
| Oil Dripping | Oil seal worn<br>Cracked manifold | Check and replace oil seals<br>Replace manifold |
| Fluctuating Pressure | Unloader not adjusted<br>Valves worn<br>Dirt or blockage in valves<br>Pump sucking air<br>Worn plunger packing | Adjust to specifications<br>Replace with valve kit<br>Clean or replace valve<br>Check water/detergent supply<br>Replace packing kit |
| Pump Head Overheating | Extended period in bypass | Pull trigger gun for water flow |

RAMTEQ

# Limited One Year
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How to Obtain Warranty Service

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# Manufacturers Warranty Period

**Click on pictures to open manufacturers website.**

5 years

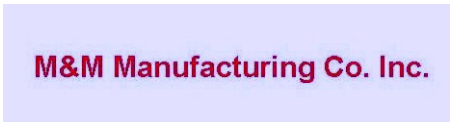
5 years

3 years

3 years

3 years

18 months




3 years

18/36 months

1 year